Catering Equipment Association,
Confederation House,
84/86 Lower Baggot Street,
Dublin 2.

Eamon Ryan, T.D.,
Minister for Communications, Energy and Natural Resources,
Department Of Communications, Energy and Natural Resources,
29-31 Adelaide Road,
Dublin 2.

15th October 2009

RE: Accelerated Capital Allowance Scheme

Dear Minister,

Please find enclosed the application by the Catering Equipment Association for the inclusion of Energy Efficient Commercial Catering Equipment in the above scheme.

We believe the inclusion of such equipment would represent an important step in reducing carbon emissions from our sector and the wider economy.

Should you have any queries in relation to this submission please contact us by return.

Yours sincerely,

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BRIAN BRADY
CHAIRMAN CEA TECHNICAL COMMITTEE

Application For The Inclusion Of Energy Efficient Commercial Catering Equipment In The Accelerated Capital Allowance Scheme

The Catering Equipment Association

The Catering Equipment Association (CEA) actively represents and promotes the Commercial Catering Equipment Industry and associated food services industry, and are the owners of CATEX, the largest Catering and Hospitality exhibition in Ireland. The current membership of CEA stands at fifty companies, and is growing rapidly. CEA is affiliated to Food and Drink Industry Ireland, within IBEC, as well as being a member of the European Federation of Catering Equipment Manufacturers (EFCEM), which represents the industry at EU level.

Purpose

The purpose of this submission is to include energy efficient Commercial Catering Equipment on the Accelerated Capital Allowance (ACA) list as a first step to promote energy efficient catering equipment.

Key Points In Support Of The Inclusion Of Energy Efficient Catering Equipment On The ACA list

1 *Government Intervention Is Required As A Catalyst To Promote Energy Efficient Equipment Due To The Fragmented And Diversified Nature Of The Industry*

The commercial catering equipment industry is fragmented and diversified in terms of the key stakeholders: -

- Manufacturers of equipment
- Purchasers of equipment
- Dealers who supply equipment

From the Manufacturer's perspective, the production volumes of commercial catering equipment are much smaller than for domestic equipment. Commercial equipment has typically a much longer life-span of 5 to 20 years. This means that the payback period for product development (and associated costs) of energy efficient equipment is much greater.

Purchasers of equipment have typically had little or no knowledge of running costs and procure on the basis of price only (i.e. capital cost).

Dealers may have energy efficient equipment available but are unable/unwilling to promote it as it is typically more expensive and will make them look uncompetitive to a purchaser with limited knowledge of running costs.

In summary, there is a need to financially incentivise ***all*** stakeholders to promote and procure 'green' equipment, which only Government can do.

2 Long Lifespan Of Equipment Means That Delays in Promoting Efficient Equipment Now, Will Result In Avoidable Energy Waste

The typical lifespan of commercial catering equipment is between 5-20 years on average. Inefficient equipment purchased in 2009 could be in service in 2029 resulting in avoidable energy waste. It is therefore critical than energy efficient equipment is specified and installed *now* in order to meet carbon reduction goals.

3 Big Differences In Energy Performance Exist Between Equipment

There is significant disparity in energy efficiency in product categories, with the 'cheapest' equipment almost always being the least energy efficient. There is potential for significant improvement in energy performance without excessive additional capital cost. In some instances the payback happens within 2 to 3 years, with savings resulting thereafter. The capital costs can, in some cases, only represent 10% of the lifecycle costs, the balance of costs are from energy, maintenance and consumables.

4 EFCEM Test Methodologies Will Provide An Objective Basis To Compare Equipment

EFCEM (who represent our industry at EU level) recognises the key role of energy efficiency and has undertaken the work of developing test methodologies for catering equipment to rate energy efficiency. To date, two standards are complete (open burners and boiling pans) and others are in progress. These standards will, in time, allow manufacturers to declare efficiency ratings. This will allow an objective method to compare products and set minimum thresholds for inclusion on the ACA list.

Summary

Commercial kitchens need to be able to prepare large volumes of food to a required timescale resulting in high energy use in order not to compromise the safety of food for the public. CEA are proposing equipment for the ACA list that will minimize this energy use by providing incentives to stakeholders to prioritise the supply of Energy Efficient equipment.

We recognize that a commercial kitchen is a system and that there are other factors that contribute to energy use that are outside the scope of this submission. Mainly these are maintenance of the equipment to ensure optimum performance and correct use of the equipment by staff.

In conclusion the CEA propose the following:

1 The equipment in Appendix A to H of this submission should be included on the ACA list as they are significantly more energy efficient than rival equipment.

2 Equipment covered by the EFCEM standards (Open Burners and Boiling Pans) should be included on the ACA list, provided they meet minimum efficiency ratings, which are to be agreed between the CEA and SEI.

Appendices

A Water Boilers
B Combi Ovens
C Induction hobs
D Cook & Hold Ovens
E Salamanders
F Refrigerators
G Undercounter & Hood Dishwashers
H Banqueting Carts
I Open Burners (EFCEM Standard)
J Boiling Pans (EFCEM Standard)

Appendix A Water Boilers

Equipment

Marco Ecoboilers

Brief Description Of Equipment

Ecoboiler Range – Automatic fill catering water boilers. These are typically used in canteens to dispense hot water for coffee/tea.

List Of Features That Make The Product Energy Efficient

Key Features :

- Energy
  i. 40% reduction in heat loss over competitor units.
     1. Improved insulation to help prevent conductive, convective and radiative heat loss.
     2. Improved isolation of the Tank to help prevent conductive heat loss .
     3. Reduced surface area of the tank to help prevent conductive, convective and radiative heat loss.

  ii. Will repay capital investment in 7 years

- Recycling/ reuse
  i. 100% recyclable.
  ii. Designed for easy disassembly and recycling

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Comparison Table Of Proposed Equipment v's Inefficient Equipment

(Based on a 24 hour day comparison)

	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Marco Ecoboiler	446	64.67	67	494	200
Competitor A	910	132			

Appendix B Combi Ovens

Equipment

Altoshaam 10.10ES Combi oven

Brief Description Of Equipment

'Combi' ovens are used to cook food by combined use of convection heat and steam. Alto Shaam combi oven is a versatile oven that has 50% faster cooking times than some of its competitors.

List Of Features That Make The Product Energy Efficient

- Closed system that saves 70% on water use and 15% on energy costs.
- Eco smart system also emits less cold air into the cooking chamber to save on energy.
- Faster cooking times are achieved thus saving on energy.
- Savings on use of gas, electricity and water also contribute to a faster ROI

Comparison Table Of Proposed Equipment v's Inefficient Equipment

(Based on a 7 hour day, 6 days per week, 52 weeks)

	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Altoshaam 1010.ES	31012	4496	1805	8950	5353
Competitor A	43461	6301			

Appendix C Induction Hobs

Equipment

We propose that all models of commercial induction hob be included in the ACA list as they are all more energy efficient that traditional electric boiling tops.

Brief Description Of Equipment

Induction hobs work by producing an eddy current in an electrically conductive pan, thus heating the pan.

List Of Features That Make The Product Energy Efficient

- 90% of the induction energy goes to the pan (compared with 50% for gas and 60% with electric)
- Energy is only used when the pan is on the hob
- Less thermal heat loss as it is the pan that is heated, not the cooker surface

Comparison Table Of Proposed Equipment v's Inefficient Equipment

(Based on a 7 hour day, 6 days per week, 52 weeks)

	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Electric 4 Plate Induction Hob	24024	3483	1584	6480	4696
Electric 4 Plate Boiling Top	34944	5067		2500	

Appendix D Cook & Hold Ovens

Equipment

Altoshaam 750 TH2

Brief Description Of Equipment

Cook and Hold Ovens can cook meats and other produce without the need of combi ovens all using a 13amp plug. It cooks meats and produce at a low temperature either overnight or when chefs need the use of the oven.

List Of Features That Make The Product Energy Efficient

- Uses the Halo heat element instead of cal rod thus saving energy.
- Uniform heating ensures even cooking of produce instead of using combi ovens thus saving electricity or gas and water.
- Less weight loss on produce up to 40%
- 13amp plug and overnight cooking instead of 3 phase or gas
- Will cook produce up to 163 deg C so combi oven can be eliminated
- No need for extraction hoods thus saving energy
- This oven was endorsed by the ESB and has won many energy efficient accolades

Comparison Table Of Proposed Equipment v's Inefficient Equipment (Based on a 7 hour day, 6 days per week, 52 weeks)

	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Altoshaam 750 TH2	6552	950	950	6750	2817
Competitor A	13104	1900			

Appendix E Salamanders

Equipment

Giorik SRH 2060 and SRH1060

Brief Description Of Equipment

Salamanders are open equipment which heat food by radiating heat from top to bottom. The Giork Hi Touch Salamander models SRH2060 and SRH1060 have a number of unique features that make them highly energy efficient.

List Of Features That Make The Product Energy Efficient

- Heating time to reach cooking temperature significantly reduced (8 seconds which is 70% less than competitor machines)
- Electrical consumption reduced due to a sensor on the equipment which detects the presence of the plate and only turns the power on when plate is present. When the plate is removed, the salamander automatically switches off
- Heating elements can be activated independently

Comparison Table Of Proposed Equipment v's Inefficient Equipment (Based on a 7 hour day, 6 days per week, 52 weeks)

	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Giorik SRH 1060	9828	1425	475	2750	1409
Competitor A	13104	1900		1350	

Appendix F Refrigerators

Equipment

Foster Eco Refrigeration/freezers/ upright and undercounter

Brief Description Of Equipment

Commercial refrigerators and freezers are used to keep food chilled / frozen in commercial kitchens. Eco Pro cabinets are built to out perform and out last other products, with cutting edge refrigeration technology, low running costs. 99% recyclable.

List Of Features That Make The Product Energy Efficient

- Hydrocarbon natural refrigerant which gas Zero ODP and low GWP rating
- Helium leak tested
- Advanced ECM fans and clever circuit design allow efficiency
- Cabinets pay for themselves in 10 years * based on Ind data
- Double dipped coils
- Air Ducted to Base
- Corrugated Evaporator Fans.

Comparison Table Of Proposed Equipment v's Old Foster Gastro Models

(Based on a 24 hour day)

Model	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Foster/single Eco pro 600h	675	97	97	1906	290
Foster/2 door Eco pro 1350	1030	149	149	2649	443
Foster/single Epro g 600L Freezer	2693	390	390	2273	1158

Model	Annual Energy Consumption (Kwh)	Annual Running Costs (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Foster Under Epro 1/2h	582	84	84	2194	250
Foster Under Epro 1/2L Freezer	782	113	113	2552	336

Appendix G Undercounter & Hood Dishwashers

Equipment

Electrolux 'green and clean' dishwashers (Models 502033 & 504233)

Brief Description Of Equipment

Undercounter dishwashers are used to clean tableware where space is restricted and volumes are low to medium. Hood type dishwashers are used for medium volumes and have a lift up 'hood' to pass dishwash baskets pass through it.

List Of Features That Make The Product Energy Efficient

- Minimal use of water compared to competitor machines (3 litres per cycle v's 4.3 litres per cycle for undercounter model) resulting in large energy savings due to reduced electrical load to heat water.
- Double skinned insulated wall reduces conductive heat losses
- Due to reduced water consumption, detergent use is also reduced significantly (not a direct energy saving, but a big environmental and cost saving)

Comparison Table Of Proposed Equipment v's Inefficient Equipment (based on 70 cycles per day, 15'C water inlet, 300 days per annum)

	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Electrolux 502033	3068	445	147	2505	436
Competitor A	4082	592			

Appendix H Banqueting Carts

Equipment

Altoshaam BQ96

Brief Description Of Equipment

Eco smart halo heat uniform heat source that gently surround food for longer holding life.

List Of Features That Make The Product Energy Efficient

- Halo heat instead of cal rod elements
- No need for water.
- Close temperature tolerance and even heat application provides even heat from top to bottom.
- Daily consumption of electricity is halved over cal rod elements.
- Winner of energy star in USA that found it was 60% more efficient over its nearest competitor over use for a full day.

Comparison Table Of Proposed Equipment v's Inefficient Equipment (Based on a 7 hour day, 6 days per week, 52 weeks)

	Annual Energy Consumption (Kwh)	Annual Running Costs € (based on Electric €0.145 per kwh)	Annual Saving €	Capital Cost €	CO_2 Savings (Kg per annum)
Altoshaam BQ96	3494	506	127	5500	376
Competitor A	4368	633			

Appendix I Open Burners (EFCEM Standard)

Energy Efficiency Standard for:

Commercial Open Flame Burners

As recognised by EFCEM National Associations

This is one of a series of standards published by EFCEM covering the key categories of commercial catering equipment.

The standards are published in order to provide an agreed test methodology against which manufacturers can evaluate the energy efficiency of their equipment and declare its efficiency rating as a percentage figure.

1. Scope

This efficiency test standard sets out the requirements and test methods for measuring and recording the energy used by a gas heated **Open flame burner.**

2. Normative references

The standard incorporates by means of dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only if incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

Normative references:
EN203-1: 2005.
EN203-2-1

3. Performance characteristics

3.1 General performance

For the following, tests are carried out under general conditions as described in **4.1**

3.2. Open flame burners

When tested in accordance with **4.2**, the thermal efficiency shall be declared as a %

4. Test conditions

4.1 General conditions of test

For this test the ambient temperature shall be maintained between 20 °C and 25 °C.
The burner is adjusted to its maximum nominal rate with the corresponding reference gas.
The test is carried out with the pan support in place.

Aluminium pans are used which have a matt base polished sides and the characteristics described in EN 203-2-1:2005, table 101 and 102 and figure 101.

The test is carried out with the pan cover in place.

The required area of the base of the pan is given by the following formula:
$S = 212 \times Q\text{n}$ (1)

Where;
*Q*n is the nominal heat input based on the net calorific value, kilowatts
S is the area of the base in centimetres squared.

If there is no pan corresponding to the heat input of the burner, two test are carried out, one with a pan
having the immediate greater diameter and one with a pan having the immediate smaller diameter. The
results are plotted on a graph, and a result is obtained by interpolation.
Because of the construction, it is allowed to off-centre the pan defined in table 102 from the burner during this test.

4.1.1 Test room

The test room shall be maintained at an ambient temperature of (20 +/- 5) deg C unless otherwise specified.

The room shall be adequately ventilated, but free from draughts likely to affect the performance of the appliance.

The appliance shall be installed and adjusted according to the manufacturers instructions, using one of the reference test gases of the appropriate family and group set at the normal appliance inlet pressure.

Before any tests are made, the appliance shall be operated at its full working temperature and at its nominal rate for a period sufficient to dry the insulation and to remove any products which might otherwise affect the test results.

The appliance shall be at room temperature at the start of each test unless otherwise stated.

During testing, the initial settings shall not be altered unless specifically required by the test method.

The test pressure shall be measured to correct to within +/- 2 % and controlled so that the variation does not exceed +/- 2 %

Unless otherwise specified, appliances with regulating or limiting devices shall be tested with those devices at their maximum setting if the setting is intended to be altered by the user.

Appliances requiring a water supply shall be connected to a supply of appropriate pressure and the water level adjusted in accordance with the manufacturers instructions. If not designed to be connected to a water supply, the water container shall be filled to the indicated level for each test and, when necessary, be maintained at this level during the test.

4.1.2 Preparation of the appliance

The appliance shall be installed and adjusted according to the manufacturers instructions, using one of the reference test gases of the appropriate family and group set at the normal appliance inlet pressure.

Before any tests are made, the appliance shall be operated at its full working temperature and at its nominal rate for a period sufficient to dry the insulation and to remove any products which might otherwise affect the test results.

The appliance shall be at room temperature at the start of each test unless otherwise stated.

During testing, the initial settings shall not be altered unless specifically required by the test method.

The test pressure shall be measured to correct to within +/- 2 % and controlled so that the variation does not exceed +/- 2 %

Unless otherwise specified, appliances with regulating or limiting devices shall be tested with those devices at their maximum setting if the setting is intended to be altered by the user.

Appliances requiring a water supply shall be connected to a supply of appropriate pressure and the water level adjusted in accordance with the manufacturers instructions. If not designed to be connected to a water supply, the water container shall be filled to the indicated level for each test and, when necessary, be maintained at this level during the test.

4.2.1 General

The burner is adjusted to its nominal rate.

The test shown in **4.2.2** is carried out with the pan support in place.

Aluminium pans are used which have a matt base, polished sides and the characteristics described in EN203-1: 2005.

The test is carried out with the pan lid in place.

The required area of the base of the pan is given by the following formula
$S = 212Qn$

Where

Qn is the nominal heat input based on net calorific value, in kilowatts;

S is the area of the base in square centimetres

If no pan is available corresponding to the size of the burner, two tests are carried out, one with a pan having the immediately greater diameter and one with a pan the immediately smaller diameter.

The results are plotted on a graph, and a result corresponding to the calculated area is obtained by interpolation.

4.2.2 Efficiency

The pan is filled with the quantity of water corresponding to the heat input table shown in EN 203-1.

The initial temperature of the water shall be (20 +/- 1) degrees C when measured at the centre of the water, using a mercury thermometer or equivalent, fixed by a correctly adjusted stopper through the lid.

The burner is extinguished as soon as the rise in water temperature of the water reaches 70 K.

It is then considered that the hot condition has been reached.

The pan previously used is replaced with the standard pan containing the corresponding mass of water at (20 +/- 1) degrees C.

As soon as the water temperature reaches 70 K above its initial value, the burner is extinguished and the gas consumption and maximum water temperature attained is measured.

The efficiency is given by:

$$R = \frac{m \times Cp \times (t2 - t1) \times 100}{Vc \times Hi}$$

Where :

R efficiency is the, in per cent;
M is the mass of water, in kilograms*;*
Cp is the specific heat of water [4, 186 x 10-3 MJ/(kg.degs C)];
t1 is the initial water temperature, in degrees Celsius ;
t2 is the final water temperature, in degrees Celsius;
Vc is the volume or mass os gas burned, in cubic metres or kilograms*.*

The volume of gas consumed determined from the volume measured is given by;

$$Vc = Vmes \times \frac{Pa + P - Pw}{1\,013{,}25} \times \frac{288{,}15}{273{,}15 + ts}$$

where

Vmes is the volume of gas measured in cubic metres;

Pa is the atmospheric pressure in millibars

P is the supply pressure of the gas at the point of measurement of the heat input In millibars

Pw is the partial pressure of water vapour in millibars;

Ts is the temperature of the gas at the point of measurement of heat input in degs Celsius;

Hi is the nett calorific value of the gas, in megajoules per cubic metre (kilocalories per cubic metre) or megajoules per kilogram.

Ends

Appendix J Boiling Pans (EFCEM Standard)

Energy Efficiency Standard for:

BOILING PANS

www.efcem.com

Member associations

FRANCE www.syneg.org
GERMANY www.hki-online.de
IRELAND www.cea.ie
ITALY www.ceced.org
NETHERLANDS www.nvlg.nl
SPAIN www.felac.com
SWEDEN www.bfs.se
TURKEY www.tusid.org.tr
UNITED KINGDOM www.cesa.org.uk

As recognised by EFCEM National Associations

This is one of a series of standards published by EFCEM covering the key categories of commercial catering equipment.

The standards are published in order to provide an agreed test methodology against which manufacturers can evaluate the energy efficiency of their equipment and declare its efficiency rating as a percentage figure.

1 Scope

This efficiency test standard sets out requirements and test methods for measuring and recording the energy used by a gas heated or electrical heated boiling pan.

2 Normative references

EN 437
EN 203-1:2005
EN 203-2-4
EN 13886
EN 1717
EN 60335-1
EN 60335-2-47

EN 203-1:200X: Gas Heated Catering Equipment Part 1 - Safety requirements

pr EN 13886: Food processing machinery- Cooking kettles equipped with stirrer and/or mixer - Safety and hygiene
requirements

EN 1717: Protection against pollution of potable water in water installations and general requirements of devices to prevent pollution by backflow

3 Test room and preparation of the appliance

The ambient temperature of the test room shall be maintained at (20 ± 5) ^{o}C.

The room shall be adequately ventilated but free from draughts likely to affect the performance of the appliance.

The appliance shall be installed and adjusted according to the manufacturer's instructions.

Before proceeding with the tests, the appliance shall be operated at its maximum working temperature at nominal rate for a period sufficient to dry the insulation and remove any temporary finish products that could affect the test procedure.

The appliance shall be at room temperature at the start of the test.

During testing, the initial adjustment of the appliance shall not be altered.

The test pressure shall be measured to correct to within +/- 2 % and controlled so that the variation does not exceed +/- 2 %

Appliances with regulating or limiting devices shall be tested with those devices at their maximum setting if the setting is intended to be altered by the user.

Appliances requiring a water supply shall be connected to a supply of appropriate pressure and the water level adjusted in accordance with the manufacturer's instructions. If not designed to be connected to a water supply, the water container shall be filled to the indicated level for each test and, when necessary, be maintained at this level during the test.

4 Tilting boiling pans

The kettle shall only be tilted by a voluntary action of the operator. This requirement shall be the same when the kettle is tilted back to its working position.

When actuators are released in any tilting position of the kettle, it shall remain stationary.
In the case of a manual control device, it shall be so designed that the tilting motion is controlled during all of its motion.

It shall not be possible to adversely influence the tilting action other than by the intended means.

The kettle shall be self balanced or self locking.

In the case of power operated tilting of the kettle, it shall be achieved by a maintained action control device which shall be situated outside the danger zone, and located where the operator can see clearly the movement of the kettle during the tilting.

The tilting mechanism shall be self-locking to prevent unintended movements of the kettle in every position in case of failure of the power.

Devices controlling the tilting process shall be clearly marked to show the direction of movement.

The control devices shall be located and protected in such a way that they cannot be operated accidentally.

For tilting devices using auxiliary energy, the minimum time for tilting shall be 20 s.

4.1 Covers

Covers shall be constructed in such a way so as to insure that uncontrolled closure does not cause injury to the operator.

4.2 Boiling pans fitted with stirrers and/or mixers

The safety and hygiene requirements and/or measures given in EN 13886 shall be complied with.

Stirrers/mixers which can be moved between adjacent kettles, shall be designed and positioned so as to prevent obstruction of the combustion products evacuation outlet or duct.

4.3 Special requirement for tilting boiling pans

The main burner shall be shut off at the beginning of the tilting action.

4.4 Pressurised parts

Pressurised appliances shall be fitted, in addition of pressure regulator(s), with relief valves of which the calibrated pressure and relief can not be modified.

The relief valve(s) shall be located in such a way to not be a risk in case of opening.

The lockout mechanism(s) of the cover shall be design to prevent any unintended under pressure opening.

It shall not be possible to open the lid or cover of a pressurised appliance until the pressure has been reduced to approximately atmospheric pressure.

Pressurised boiling pan and jackets shall incorporate a vacuum release device to prevent a partial vacuum forming unless they are designed for vacuum operation.

In all cases pressurised boiling pans shall satisfy the pressure tests of 7.8.2 of EN 203-1:2005.

A pressurised boiling pan shall be fitted with a pressure gauge or indicator device.

4.5 Temperature limits

For this test the boiling pan is filled with water to its nominal level.

5 Methodology

The pan and jacket (if applicable)is filled with a measured quantity of water, to the indicated level stated by the manufacturer, the water being at approximately 15^0C.

Tests are carried out with the lid closed.

The temperature of the water is measured at the centre of the pan, 10 cm below the surface of the water. The water is not stirred.

5.1 Gas heated boiling pan

The test is carried out with one of the reference gas of the category to which the appliance belongs. The burner is adjusted to its nominal rate.

The requirements for test gases are specified in Annex A of EN 437.

The burner is adjusted to its nominal rate.

The burner is ignited and the measurement of time, gas consumption and temperature rise starts when the temperature of the water reaches (20 □ 1)^{0}C (*t*1).

The time and gas consumption required to reach a temperature rise of 70 K are noted.

At the end of the test, after extinction of the burner, the maximum water temperature reached is measured (*t*2)

If boiling point is reached during this test, the test is repeated with a lower rise of temperature.

5.2 Electrical heated boiling pan

The test is carried out with the electrical supply given by the manufacturer with a tolerance of +/- 5%.

Supply is switched on and the measurement of time, electric consumption and temperature rise starts when the temperature of the water reaches (20 ± 1)^{0}C ($t1$).

The time and electric consumption required to reach a temperature rise of 70 K are noted.

At the end of the test, after extinction of the burner, the maximum water temperature reached is measured ($t2$)

If boiling point is reached during this test, the test is repeated with a lower rise of temperature

6 – Efficiency

6.1 – Gas heated boiling pan

The efficiency is given by:

$$N = \frac{m\, C_p\, (t_2 - t_1) \times 100}{V_c \times H_1}$$

Where:

R is the efficiency, in per cent;

m is the mass of water in kilograms;

Cp is the specific heat of water [4,186 x 10-3 MJ/(kg.K)];

t1 is the initial water temperature in degrees Celsius;

t_2 is the final water temperature in degrees Celsius;

Vc is the volume or mass of gas burned in cubic metres or kilograms;

H_1 is the net calorific value of the gas in megajoules per cubic metre or megajoules per kilogram (kilocalories per cubic metre).

The volume of the gas consumed determined from the volume measured is given by:

$$V_c = V_{mes} \times \frac{p_a + p - p_s}{1013{,}25} \times \frac{288{,}15}{273{,}15 + t_g}$$

where:

Vmes is the volume of gas measured in cubic metres;

pa is the atmospheric pressure in millibars;

p is the supply pressure of the gas at the point of measurement of the heat input in millibars;

ps is the partial pressure of water vapour in millibars (as defined in 7.3.2.1 of EN 203-1:200X);

tg is the temperature of gas at the point of measurement

6.2 – Electric heated boiling pan

The efficiency is given by

$$R = m \times Cp \times \frac{(t_1 - t_2)}{E} \times 100$$

Where:

R is the efficiency, in per cent;

m is the mass of water in kilograms;

*C*p is the specific heat of water [4,186 x 10-3 MJ/(kg.K)];

*t*1 is the initial water temperature in degrees Celsius;

t_2 is the final water temperature in degrees Celsius;

E is the energy consumption.